Space Weather Forecast

Issued on Wednesday, 18 September 2024 at 00:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME influences gradually declining on Day 1 (18 Sep). Chance of S1/Minor Radiation Storm. Ongoing Chance of M-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Low, with only Common-class x-ray flares observed, peaking with one at 17/0640 UTC from a complex sunspot group in the southeast.

There are currently six sunspot regions on the visible disc, one of which is unnumbered. The largest and most complex region on the disc is located in the southeast quadrant, with its delta configuration. This region remains perhaps the most noteworthy group due to its history of X-class activity. The next region of note is located in the southwest quadrant, although this is becoming more difficult to analyse due its viewing angle. The remaining regions are relatively small and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were in evidence in the period.

Solar Wind / Geomagnetic Activity: Solar wind parameters continued to show the effects of the CME, which arrived late on the 16 Sep. Solar wind speeds started the period at elevated to strong levels, reaching a peak of 649km/s at 17/0700UTC, before gradually declining to the current slightly elevated levels, near 450km/s. The Earth's magnetic field was strong at the start of the period due to CME influences, but has now declined to moderate levels. The north-south component was strongly negative (southward) at first due to the CME arrival, before reducing to the current weak levels. The net result of the above solar wind measures was a peak G4/Severe Geomagnetic Storm (Kp 8) interval (17/0000-0300 UTC) before gradually declining to the current Unsettled (Kp3) to Active (Kp4) conditions.

Energetic Particles / Solar Radiation: Solar radiation was slightly above normal background levels following the generative Strong-class x-ray flare on 14 September. Levels rose to S1/Minor Solar Radiation Storm around 17/0725 UTC but have since declined to below the S1 threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is forecast, with a chance of Moderate-class flares. There is a slight chance of an isolated Strong-class flare from the southeastern sunspot group especially given its history. No significant regions are expected to arrive or depart in the period and the risk is deemed roughly constant as a result.

Solar Wind / Geomagnetic Activity: The effects of the CME, which arrived late on the 16 Sept, are beginning to gradually wane. Solar winds will continue to be Slightly Elevated, possibly increasing back up to Elevated levels due to the onset of a possible coronal hole fast wind, which may arrive late on Day 1 or Day 2 (18-19 Sep). No other Earth-directed feature in the

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forecast.

Geomagnetic activity is most likely to be Unsettled or Active on Day 1 (18 Sep), with a slight chance of reaching G1/Minor Storm levels if the fast wind from CH70/+ occurs late on Day 1 or Day 2 (18-19 Sep). Quiet conditions are likely from Day 3 (20 Sep).

Energetic Particles / Solar Radiation: Solar radiation is currently just below the S1/Minor Storm level, which should continue to decline on Day 1 (18 Sep) and returning to background by Day 2 (19 Sep). Slight chance of S1 throughout.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	10	10	1	1
Strong	G3	Yes	1	1	1	1
Severe	G4	Yes	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	40	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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